City University of Hong Kong
Course Syllabus

offered by Department of Systems Engineering
with effect from Semester A 2024 / 25

Part I Course Overview

Course Title:	Special Topics in Computational Optimization
Course Code:	SYE8107
Course Duration:	One semester
Credit Units:	1
Level:	R8
Medium of Instruction:	English
Medium of Assessment:	English
Prerequisites: *(Course Code and Title)*	Nil
Precursors: *(Course Code and Title)*	Nil
Equivalent Courses: *(Course Code and Title)*	SEEM8107 Special Topics in Computational Optimization (offered until 2021/22) ADSE8107 Special Topics in Computational Optimization (offered until 2023/24)
Exclusive Courses: *(Course Code and Title)*	Nil

Part II Course Details

1. Abstract

This course will cover a wide range of topics related to the computational methods encountered in operation research applications. Topics covered in this course will include data structures, design and analysis of algorithms, programming paradigms and languages, development tools and environments, numerical analysis, and matrix computations.

2. Course Intended Learning Outcomes (CILOs)

No.	CILOs	Weighting (if applicable)	Discovery-enriched curriculum related learning outcomes		
			A1	*A2*	*A3*
1.	Describe the basic principles, methodologies and tools in computational optimization.	20%		✓	
2.	Understand basic computational algorithms for optimization.	30%			✓
3.	Understand basic programming tools for implementations.	30%			✓
4.	Learn to use basic programming environments and tools.	20%	✓		
		100%			

A1: *Attitude*
Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.

A2: *Ability*
Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to self-life problems.

A3: *Accomplishments*
Demonstrate accomplishment of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

3. Learning and Teaching Activities (LTAs)

LTA	Brief Description	CILO No.				Hours/week (if applicable)
		1	2	3	4	
Large class Activities	Delivery of the course will be achieved through a series of formal lectures supported by practical case studies. A series of lectures will introduce basic elements and importance of computational optimization.	✓	✓	✓	✓	13 hours/semester
Mini-project	A typical optimization case study will be given to students to solve. The students are expected to work in teams to tackle the given problem. This learning activity will be mainly student-led but with some structural guidance from the teacher.	✓	✓	✓	✓	4 hours/semester

4. Assessment Tasks/Activities (ATs)

Assessment Tasks/Activities	CILO No.				Weighting	Remarks
	1	2	3	4		
Continuous Assessment: 100 %						
Mini-Project	✓	✓	✓	✓	100%	
Examination: 0 % (duration: , if applicable)						
					100%	

5. Assessment Rubrics

Applicable to students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter

Assessment Task	Criterion	Pass (P)/ Fail (F)
1. Mini-Project	Project is completed in groups and is graded by the course leader.	Pass/ Fail

The grading is assigned based on students' performance in assessment tasks/activities.

This is a Pass/Fail course.

Applicable to students admitted from Semester A 2022/23 to Summer Term 2024

Assessment Task	Criterion	Pass (P)/ Fail (F)
1. Mini-Project	Project is completed in groups and is graded by the course leader.	Pass/ Fail

The grading is assigned based on students' performance in assessment tasks/activities.

This is a Pass/Fail course.

Part III Other Information

1. Keyword Syllabus

- Design optimization
- Gradient-based method
- Heuristic algorithm
- Complexity analysis

2. Reading List

2.1 Compulsory Readings

1.	G.L. Nemhauser and L.A. Wolsey, Integer and Combinatorial Optimization, Wiley, 1999.

2.2 Additional Readings

NIL